TRABAJO DE FIN DE GRADO

The potential of *Duolingo* to increase students' learning and motivation

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RESUMEN

Hoy en día, los idiomas son un requisito obligatorio para afrontar el actual mundo laboral. Dicha demanda y el avance tecnológico han dado paso a la creación de numerosas aplicaciones móviles (apps) que permiten a los usuarios aprender idiomas de manera autónoma. El presente trabajo de investigación se centra en el análisis de la app *Duolingo* y su potencial tanto para enseñar idiomas como para motivar hacia su aprendizaje. *Duolingo* se caracteriza por el uso de elementos de juegos, por lo cual, este trabajo comienza con un estudio sobre la gamificación enfocado en el ámbito de la educación y en el de aprendizaje de idiomas. Posteriormente se analizará, a partir de un cuestionario repartido a un total de 87 usuarios de *Duolingo*, el impacto de la app en sus usuarios tanto en términos de motivación como de aprendizaje. Los resultados obtenidos de la encuesta indican, por un lado, que si bien la mayoría de los participantes (46%) considera la app muy útil para aprender vocabulario en una lengua extranjera no la considera igual de útil para fortalecer otras competencias. Por otro lado, los resultados indican también que más de la mitad de los encuestados (51,7%) valoran que la gamificación, en general, ha afectado de manera positiva en la motivación.

Palabras clave: gamificación, aprendizaje de idiomas, motivación, *Duolingo*

ABSTRACT

Nowadays languages are an essential requirement in order to tackle today's work environment. Such need for languages together with technological advances has given way to the creation of many mobile apps that allow users to learn languages on their own. This paper focuses on the analysis of the *Duolingo* app and its potential to teach languages as well as to motivate users to continue learning. *Duolingo* is characterised by the use of gaming elements, therefore this study starts with a breakdown of the use of gamification focused in the education scope and in language learning. After this, a questionnaire was analyzed in which 87 duolingo users were asked about the impact that the app had in regards to motivation as well as in the learning itself. The results taken from the survey show, on one hand, that the

majority of participants (46%) considers the app very useful in order to learn some vocabulary in a foreign language, however, they do not consider it as useful so as to strengthen other skills. On the other hand, the results also show that more than the half of survey participants (51,7%) evaluate that gamification, generally, has affected their motivation in a positive way.

Keywords: gamification, language learning, motivation, *Duolingo*

I. INTRODUCTION

It has been shown by several researchers that, nowadays, low motivation is a common problem that affects most learners (Lee & Hammer, 2011). While it is true that times are changing, so is the way we study and receive information (Prensky, 2011). In fact, in the present days, technology plays a very important role in our everyday life. With the increasing availability and development of smartphones, it was only a matter of time that they became essential in our daily life allowing us to perform daily activities such as sending emails, checking bank accounts or using them for learning. These days, many language learning apps can be downloaded from online platforms such as *Google PlayStore* or *iOS AppStore* providing good opportunities to foster different language skills and aspects (Heil, 2016). Moreover, due to recent studies such as the one carried out by Schiefelbein et al. (2019), *Duolingo* is considered one of the top language learning applications. Its growing popularity might not only be because it is free but also because of its use of gamification. Games have always been part of human civilization (McGonigal, 2011) and gamification is understood as the use of game elements in non gaming contexts (Berns & Palomo-Duarte, 2020) with the purpose of making learning fun and motivating.

The current work aims to analyse the motivational as well as educational potential of *Duolingo* to enhance foreign language learning. To this end we will analyse two aspects: firstly, students' evaluation of the learning activities provided by the app and their impact on students' motivation and thus their learning process and secondly, students' evaluation of the different game-elements used by the app and their impact on students' motivation towards learning.

II. STATE OF THE ART:

2.1 The Concept of Gamification

Rego (2015) maintains that games have always been a source of entertainment and have been used for generations as a tool to transmit knowledge. Humans are by nature competitive creatures who can satisfy their needs of succeeding by winning rewards through games. Consequently, the concept of gamification appeared in order to exploit the motivational power of games while applying it to "real-world problems" (Lee & Hammer, 2011, p.1). Furthermore, Werbach and Hunter (2012) have analysed the concept of gamification in several studies, describing it as "the use of game elements and game design techniques in non-games contexts" (2012, p.26). According to Figueroa-Flores (2015), the main objective of gamification is to motivate the user by employing elements and techniques that are commonly used in games.

Werbach and Hunter (2012) have classified game elements into three categories: *components*, *dynamics* and *mechanics*. The components of a game are pointed out as: achievements, badges, collections, content unlocking, leaderboards, points, social graphs, virtual goods, teams, quests, levels, gifting, combat and avatars. Other elements such as constraints, narrative, relationships, progression and even emotions are part of the dynamics of a game that are, as well, described as the representation of "the highest level of abstraction of a game" (Werbach and Hunter, 2012, p.78). The mechanics consist of basic processes which lead to some actions that provoke a feeling of engagement to the user. These processes are: chances, cooperation, resource acquisition, transactions, win states, turns, rewards, feedback, competition and challenges (Werbach & Hunter, 2012). According to Sailer et al. (2016), gamification can take many forms by combining several game design elements in different ways. A large number of authors have analysed some of these elements and described them as follows:

Goals: Achieving the victory is the ultimate goal in every game. In order to motivate the player to reach this final goal, it is needed to establish intermediate goals that lead to the final one (Rego, 2015).

Mechanics: It is the organization of rules in a game. These rules explain the function of a game and what players need to do in order to achieve the objectives (Rego, 2015).

Aesthetics: According to Kapp (2012, p.46), it is highly important to get a good visualization in games by using, for example, detailed elements, simple contrasts or colourful backdrops in order to create "an immersive environment" for the player.

Storytelling: Kapp (2012), supports that stories need to be used in games because they bring meaning, context and guide action. A narration embedded in a gamified application provides characters and contextualized activities in the game, giving it more meaning apart from only obtaining rewards (Kapp, 2012). Narrative contexts based on "real-world situations", or non-game contexts, may motivate players if the story which is told is related to their personal interests (Nicholson, 2015).

Game thinking: Refers to the way of using some resources in order to motivate the player to achieve a goal (Werbach & Hunter, 2012). Rego (2015), remarks that it turns daily experiences into playful and more dynamic activities.

Collaboration: Accepting to accomplish a challenge with a partner increases the player's motivation. Teammates can be real players or virtual non-player characters known as NPCs (Kapp, 2012). Rego (2015), supports that working in groups leads to commitment and reduces evasion.

Avatars: They are visual representations of players (Werbach & Hunter, 2012) usually created by the players themselves (Kapp, 2012). Avatars provide the players an identity within the game, or gamified app, and allow them to become part of a community (Annetta, 2010).

Rewards and competition: Both are important elements to emphasize the competitive behavior in humans. The chance of winning something (points, unlocking levels, prizes, etc.) increases the players' motivation (Rego, 2015). Sailer et al. (2016) claim that competition

might also be increased with the use of leaderboards that, according to Crumlish and Malone (2009), show players' performance in a ranking. The purpose of these leaderboards is to show in which position of the ranking the players are, so the comparison between places provokes a social pressure among participants that makes them try to achieve a better position or maintain the positions they already have (Burguillo, 2010).

Feedback: Players need constant feedback on their game performance and progress while playing a game. Hunicke (2009), suggests some rules that needed to be followed as a means to produce a proper feedback. Some of these rules are firstly, that feedback should be produced in a moment desired by the player; secondly, that it should be continually repeated and thirdly, that it should be related to the game context.

Levels: The objectives of progressing in different levels are to maintain the narration of the game, to improve players' skills and to present a challenge in which participants will feel motivated enough to keep working on it (Kapp, 2012).

Points: They are considered basic elements for games and gamified applications (Zichermann & Cunningham, 2011). Points are used as a reflection of players' effort in a game (Sailer et al., 2013).

Badges: Werbach and Hunter (2012) describe badges as visual representations of players' achievements within a game. Badges are given to symbolize merits (Anderson et al., 2013), like, for example, by accomplishing goals or as a representation of someone's membership in a group (Antin & Churchill, 2011).

Performance graphs: These graphs provide information about players' behaviour compared to their preceding performance during a game (Sailer et al., 2016). Players can observe the evolution of their activity during a period of time and consider their own actions.

These elements of gamification are divided into the categories "self" and "social" by Huang and Soman (2013, p. 15). The goal of the "self elements" is to encourage students to compete against themselves and recognize their own merits by using elements like badges, levels and time restrictions. "Social-elements" are those that encourage cooperation or

interactive competition by making students' achievements public so they become part of a community (Figueroa-Flores, 2015, pg. 45).

Gamification is increasing its popularity due to the abundant use of social media as a result of the easy access to the internet (Yanes & Bououd, 2019). Therefore, it has already been implemented in contexts such as work, crowdsourcing, data-collection, health, marketing, social networks, environmental protection and education (Sailer et al., 2016).

2.2 Gamification in Education

As it has been remarked, gamification is the process of using game elements in non gaming contexts. One of the sectors where gamification has become increasingly popular is education. Some of the reasons for this may lie in the fact that schools have started facing problems due to their students' low motivation and engagement (Lee & Hammer, 2011). Such problems could be motivated by the fact that most of the current students are digital natives and, therefore, engage with learning contents differently (Prensky, 2001, 2011; Yanes & Bououd, 2019). Many studies have recognised the positive impact of gamification on users' motivation (Iten & Petko, 2016), therefore, game elements have been increasingly implemented in the classrooms in order to improve students' motivation (Yanes & Bououd, 2019).

According to Kapp (2012), the objective of gamification in education is to engage the students in a challenge where they need to follow some rules in order to obtain a result based on the provision of constant feedback. Gamification could be an advantageous tool to avoid some students' negative behaviors as low focus (Yanes & Bououd, 2019). In this context Kapp (2012) claims that the most relevant game aspects which are necessary for gamification in education are: *mechanics* (points, rewards and stages that can be beaten), *aesthetics* and *game thinking* (turning an everyday situation into a competitive activity). Due to the changes in the educational interests and how new generations should be taught, many instructors are changing their teaching strategies by implementing gamification in their lessons (Figueroa-Flores, 2015). According to Huang and Soman (2013), teachers need to follow a five-step model in order to apply gamification to the teaching and learning process:

- **Understanding the target audience and the context:** Teachers ought to know their pupils' interests and the context that involve them (group size, environment and abilities).

- **Defining the learning objectives:** These objectives are divided into three goals: general instructional (by making the student complete an assignment, for example), specific learning (when the student truly understands a concept) and behavioral goals (by concentrating in class and performing the assignments in the time required). According to Huang and Soman (2013), the teachers have to combine and implement the learning objectives in order to have a favorable learning experience through gamification.

- **Structuring the experience:** Teachers prepare the course and clarify the main points where the students need to reach by the end of it. However, it can be possible that some students "stand behind" (Figueroa-Flores, 2015, p.44), therefore, the teacher needs to suggest a new method in order to motivate these students to achieve the goal. There must be a constant movement in the educational program so the learners stay motivated and engaged (Figueroa-Flores, 2015).

- **Identifying resources:** Once the teachers identify the different stages of their lessons, they need to decide which ones can be gamified. Some of the aspects to be considered are tracking mechanisms (to measure the students' evolution), levels, feedback, currency (measured in elements like, for example, points) and rules.

- **Applying gamification elements:** Once the previous steps have been accomplished, teachers can decide which elements of gamification fit best in their teaching and should therefore be applied in their lessons.

Researchers such as Lee and Hammer (2011) support that gamification does motivate students and it is a useful tool to guide them through the learning process. Figueroa-Flores (2015, p.43) also claims that many students increased their engagement since the gamified

activities became interesting “challenges to be accomplished”. Most students prefer gamified learning because it provides freedom in getting knowledge and avoids the pressure found in traditional education (Huang & Soman, 2013, p.24). However, gamification also has a few negative tendencies. One of them is that there is a minority of students who claim that they find gamified environments “childish” and “immature”, and the other is that some of them confessed that they were just focusing in the competitive part of the game making them forget about the importance of learning (Yanes & Bououd, 2019, p. 5). In brief, gamification does help students in the process of learning but as Lee and Hammer (2011) conclude; it should be only an added tool that never substitutes traditional learning.

2.3 Gamification in Language Learning

Once the European Higher Education Area (EHEA) and Bologna Process were implemented in Europe, the acquisition of, at least, one second language has become necessary in an increasingly globalized and competitive world (Gallardo et al., 2010). Brown (1994) claimed that an important factor in order to acquire a foreign language is to be motivated, therefore, gamification could be a useful tool for increasing students’ motivation (Figueroa-Flores, 2015). According to Werbach and Hunter (2012), there are two types of motivation needed in second language learning: intrinsic and extrinsic motivation. Intrinsic motivation is when people take part in an activity on their own due to the benefits it provides (e.g., fun, learning or feeling of accomplishment) and extrinsic motivation is when people take part in an activity in order to win something or avoid any kind of punishment (Lepper, 1988). Gamification fulfills both types of motivation by using game elements. Some of them like levels, points and badges motivate the learner in an extrinsic way meanwhile the feelings of achieving something, autonomy or mastery motivates the learner in an intrinsic manner.

The origins of foreign language instruction started with the Grammar Translation Method (GTM) back in the 19th century (Figueroa-Flores, 2015). The GTM aimed at teaching the target language by focusing mainly on grammar and vocabulary learning by using the learner’s mother tongue with little use of the target language (Centro Virtual

Cervantes, 2020). In that way, learners had to focus on memorizing vocabulary lists and grammar explanations instead of paying attention to pronunciation or the context where the texts were involved. Later on, educators started to center on integrating learners to real life situations by creating a theoretical structure known as Communicative Language Teaching (Figueroa-Flores, 2015, p.36). Apart from motivation, learners need to feel comfortable in the atmosphere they are placed in while learning the second language (Figueroa-Flores, 2015). For that, Brown (1994) proposed some strategies that principally increase the activity of movement and social interaction in the environment where the second language is learnt.

Ybarra and Green stated (2003), that the use of technological tools was a great advantage in order to learn a foreign language. To top it all, seventeen years later, it can be confirmed that technology is not just "a great advantage" but has become crucial for second language learning. Because of the development of technological advances through the years, the opportunity of acquiring a foreign language has become easier. Therefore, companies devoted to foreign language learning need to improve their methods due to the big competitive global market they are facing. One solution could be implementing gamification in language learning because it makes the learning experience more attractive to users by giving them the opportunity to interact with other users of the target language by teaming-up or competing against each other with the purpose of accomplishing levels (that could be grammar or vocabulary exercises) or points until reaching the final goal which is learning the target language (Figueroa-Flores, 2015). According to Figueroa-Flores, it is still unclear which elements of gamification are fully "appropriate" only for second language learning, however, researches such as the one carried out by Ferro & Walz (2013), confirm that the use of game elements in language learning motivates people to achieve their learning goals.

III. PURPOSE OF THE STUDY

The purpose of this study is to analyse the potential of *Duolingo* in order to support students in their foreign language learning process and to enhance students' motivation throughout the use of game elements. To this end we carried a study based on the following research questions (RQ):

- RQ1: What kinds of language learning skills are enhanced by using the app *Duolingo*?

- RQ2: What kinds of game elements help to increase learners' motivation towards language learning?

- RQ3: What do *Duolingo* users think about the app and its impact on their language learning and motivation?

IV. METHODOLOGY AND ANALYSIS

In order to answer the different RQs, we will first analyse *Duolingo* with a special focus on the game elements used by the app and then analyse the data from a survey that was given to 87 *Duolingo* users. The survey aimed at identifying the app's impact on the learners' learning as well as motivation.

4.1. Analysis of the App *Duolingo*

Duolingo is a free language app created by Severin Hacker and Luis von Ahn (Ferriss, 2016) which can be downloaded from online platforms such as iOS, Android, etc. (García-Botero et al., 2019). Since June 2020, the app offers 95 different language courses in

23 languages and has over 300 million registered users around the world (*Duolingo*, n.d.) Developers claim on the app's website that learning becomes easier while having fun and this is why *Duolingo* was created with the purpose to be more similar to a game than a textbook (https://en.duolingo.com/approach). As different researchers like Huynh et al. (2016) as well as Herlina-Karjo and Andreani (2018) explain, the app employs a variety of game elements to increase the users' motivation. Amongst the most frequently used game elements are the following:

- **Rewards** represented as lingots that users earn by completing lessons.
- **Leader-boards** that show users' performances.
- **Levels** which represent users daily activity.
- **Badges** the users earn by achieving lessons, **challenges**, etc.
- **Feedback** that shows users which answers are correct or incorrect allowing them to progress in their learning process.
- *Streak count* which consists in providing the user with so-called experience **points** every time a lesson is finished. This way the user feels constantly challenged by the daily **goal**.

According to the website *Captain Up Blog* (2015), *Duolingo*'s language lessons are organized in different modules that allow the user to learn vocabulary and phrases in the target language. Each module consists of five levels. Once the user has completed all the levels, the app's home page provides him/her with personalized information on his/her individual progression. Moreover, although a user has already completed different modules, after some time these will be reactivated so that the user can reinforce the previously studied language aspects (Figure 1).

Figure 1: Examples of different modules from the *Duolingo* app.

García-Botero et al. (2019) explain that *Duolingo*'s method consists in translating words and sentences through exercises (from the user's mother tongue into the target language and vice versa, pairing words in both languages, choosing the correct translated option among multiple choices, etc.) (Figure 2).

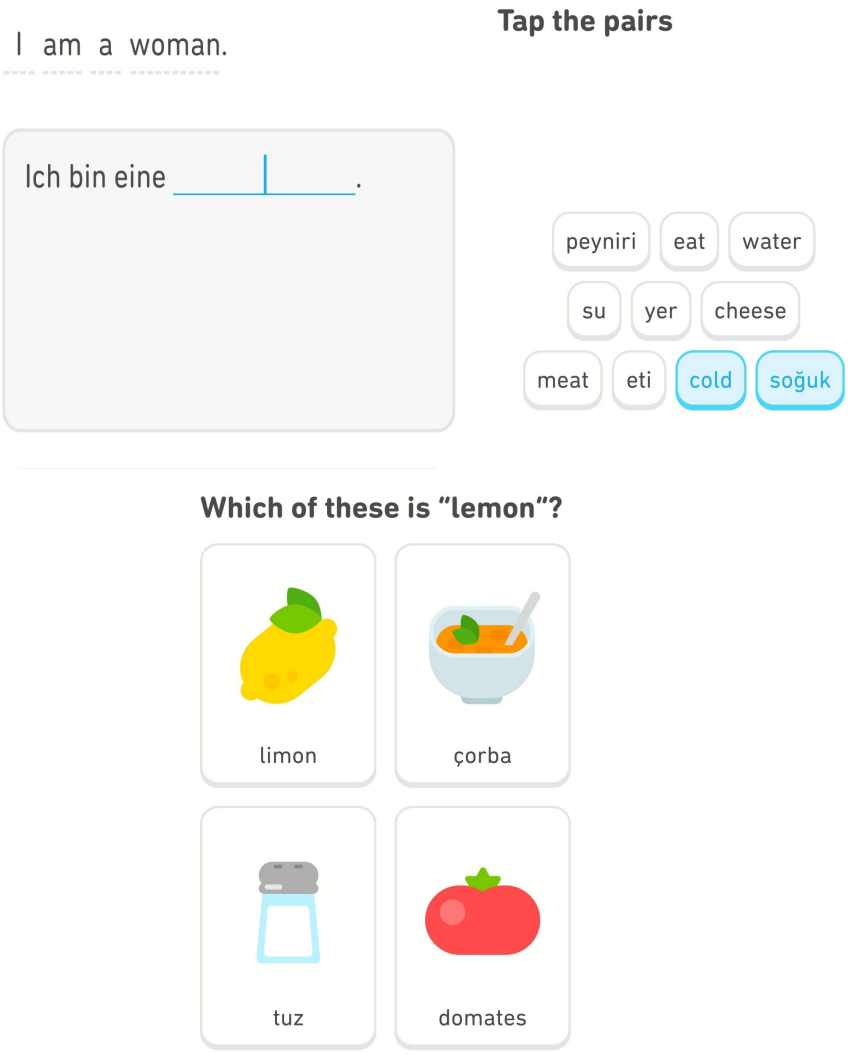

Figure 2: Examples of different translating exercises of *Duolingo*.

Translation has been related to the "outdated" Grammar Translation Method (GTM) but "surprisingly" it worked well in the case of *Duolingo* (García, 2013, p. 20). However, according to Herlina-Karjo and Andreani (2018), users need to learn the grammar of a language on their own because *Duolingo* teaches it only by giving sentences as examples.

As García-Botero et al. (2019) claim, there have been several studies about the effectiveness of *Duolingo* as a language learning tool, but none of them are conclusive. However, according to García-Botero et al. (2019) *Duolingo* is especially focused on

vocabulary acquisition so users could "reach a B1 level of the Common European Framework of Reference for languages" (García-Botero et. al, 2019, p.77)

4.2 Analysis of *Duolingo* Users' Feedback

With a view to answer the different RQs, 87 *Duolingo* users were asked to fill in a survey about their experience using *Duolingo* as part of their foreign language learning. 64,4% of the participants were women and 35,6% were men (Figure 3).

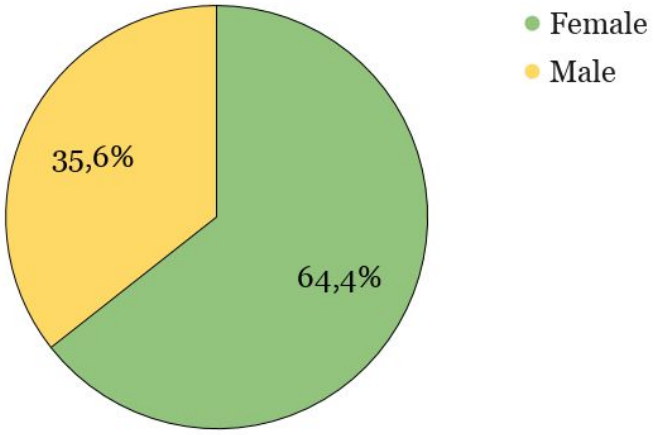

Figure 3: Pie chart representing participants' gender.

87,4% of the participants were between 20 and 40 years old, followed by 6,9% who were older than 40 years and 5,7 % who were younger than 20 years (Figure 4).

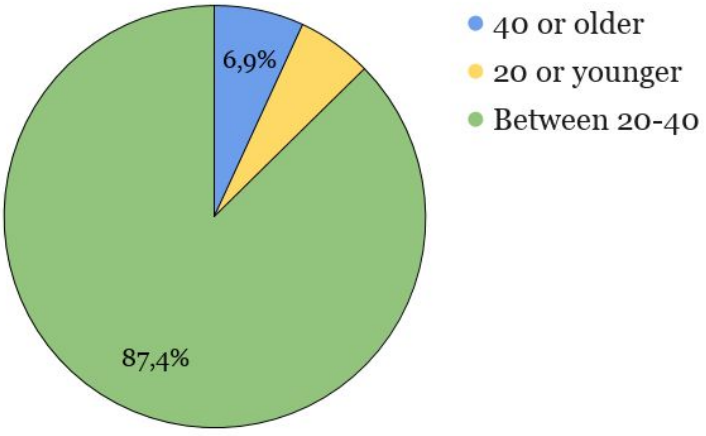

Figure 4: Pie chart representing participants' age.

The participants were also asked about their study levels which resulted in 75,9% of them having university studies, followed by 12,6% who had some professional training and, finally, 5,7% with higher studies and 5,7% with basic studies (Figure 5).

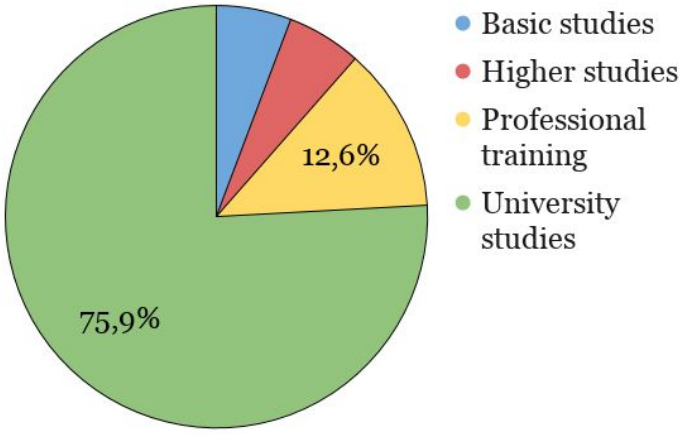

Figure 5: Pie chart representing participants' study levels.

Another question of the survey aimed at classifying participants by their different professional areas. The results show that 36,8% of them were from the area of education (i.e., teachers, students, etc.), followed by 34,5% who were working in other professional areas (classified as "others"), 14,9% who were not working at all and, finally, 13,8% who were working in different areas related to public services (Figure 6).

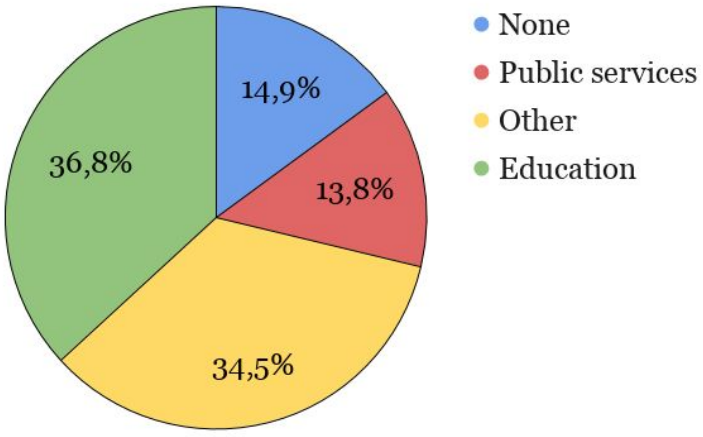

Figure 6: Pie chart representing participants' job areas.

With regard to the participants' cultural background, 96,6% of them were Spaniards followed by 3,4% who were Portuguese, Belgian or Albanian (Figure 7).

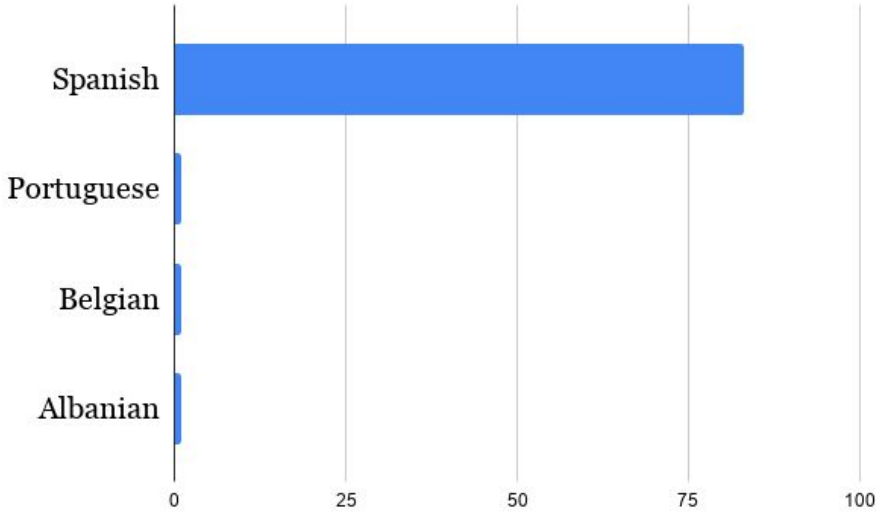

Figure 7: Bar chart representing participants' nationalities.

In addition, the results from the survey show that the most studied languages amongst the participants of the current study are German (32,2%), English (31%) and Italian (13,8%) followed by other languages such as French (6,9%), Japanese (3,5%), Polish (3,5%), Portuguese (2,3%), Catalonian (2,3%), Korean (1,2%), Spanish (1,2%), Romanian (1,2%) and Swedish (1,2%) (Figure 8).

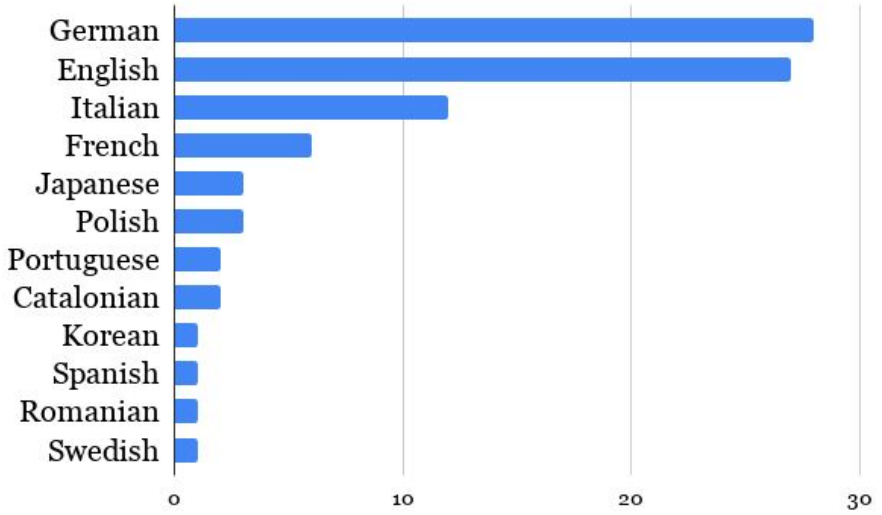

Figure 8: Bar chart representing the languages studied with *Duolingo* by the participants.

With regards to the students' level when using *Duolingo* for their language learning 54% of participants were learning the target language at a basic level, 31% at an intermediate level and only 14,9% at an advanced level (Figure 9).

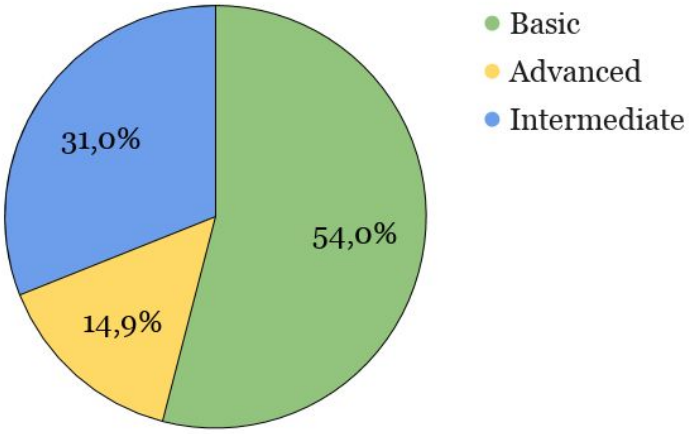

Figure 9: Pie chart representing participants' levels in the language studied with *Duolingo.*

In order to analyse RQ1 (*What kind of language skills are enhanced by using the app "Duolingo"?*), RQ2 (*What kinds of game elements help to increase learners' motivation towards learning?*) and RQ3 (*What do "Duolingo" users think about the app and its impact on their language learning and motivation?*) participants were asked to fill in a survey (Table 1). The survey aimed at gathering students' evaluation of *Duolingo* to enhance their learning and motivation. With regard to the impact of *Duolingo* on students' motivation, we were especially interested in analysing the impact of gamification. To this end, questions have been designed to first identify those aspects of language learning that are mostly supported by the app and then those aspects of gamification that contributed the most to students' motivation.

Questions	**Options to choose**
1- *How much has the app improved your **general language knowledge**?*	0= N.A 1= Not at all 2= Very little 3= Somewhat 4= Very much 5= Extremely
2- *How much has the app improved your **vocabulary**?*	0= N.A 1= Not at all 2= Very little 3= Somewhat 4= Very much 5= Extremely
3- *How much has the app improved your **grammar**?*	0= N.A 1= Not at all 2= Very little 3= Somewhat 4= Very much 5= Extremely
4- *How much has the app improved your **reading**?*	0= N.A 1= Not at all 2= Very little 3= Somewhat 4= Very much 5= Extremely
5- *How much has the app improved your **writing**?*	0= N.A 1= Not at all 2= Very little 3= Somewhat 4= Very much 5= Extremely
6- *How much has the app improved your **listening**?*	0= N.A 1= Not at all 2= Very little 3= Somewhat 4= Very much 5= Extremely
7- *How much has the app improved your **speaking**?*	0= N.A 1= Not at all 2= Very little 3= Somewhat 4= Very much 5= Extremely

8- *How would you evaluate, in general, the impact of game elements and its use by "Duolingo" on your motivation?*	0= N.A 1= Bad 2= Not so good 3= Normal 4= Good 5= Excellent
9- *How much have **the following game elements** affected your motivation?* - Leagues - Avatar - Rankings - Performance graphs - Badges - Competition - Levels - Rewards Challenges - Storytelling - Points - Feedback	0= N.A 1= Not at all 2= Very little 3= Somewhat 4= Very much 5= Extremely

Table 1: Questions from the survey related to language learning and the impact of gamification.

With regard to the first question (Q1: *How much has the app improved your **general language knowledge**?*), it stands out that less than 20% of the participants (19,5%) considered that the app helped them improving their general language knowledge (answering with *very much* (14,9%) and *extremely* (4,6%)), followed by a very high percentage of participants (51,7%) who considered that the app helped them *somewhat*. Equally noteworthy is the high percentage (27,5%) of those who considered that the app helped them improve *very little* (21,8%) or even *not at all* (5,7%). Finally, 1,1% did not know how to classify the app's impact on their general language knowledge (Figure 10).

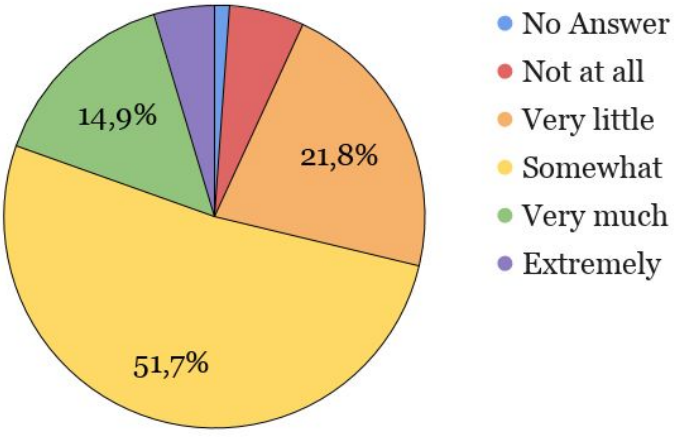

Figure 10: Participants' evaluation of *Duolingo* with regard to its impact on their **general knowledge** in the target language.

With regards to other language aspects such as vocabulary, grammar, reading, listening and speaking, the results from the survey show that the app helped students especially to improve their vocabulary knowledge. Regarding vocabulary learning (Q2: *How much has the app improved your* ***vocabulary)****?* 46% of the participants stressed that the app was helpful to improve their vocabulary learning (answering with *very much* (39,1%) and *extremely* (6,9%)), followed by 28,7% who considered that the app helped them *somewhat* for their vocabulary learning. However, 25,3% claimed that the app's impact was insignificant or even very low (answering with *not at all* (2,3%) or *very little* (23%)). The last percentage concerning vocabulary knowledge was the 1,1% of the participants who could not evaluate the app's impact as positive or negative (Figure 11).

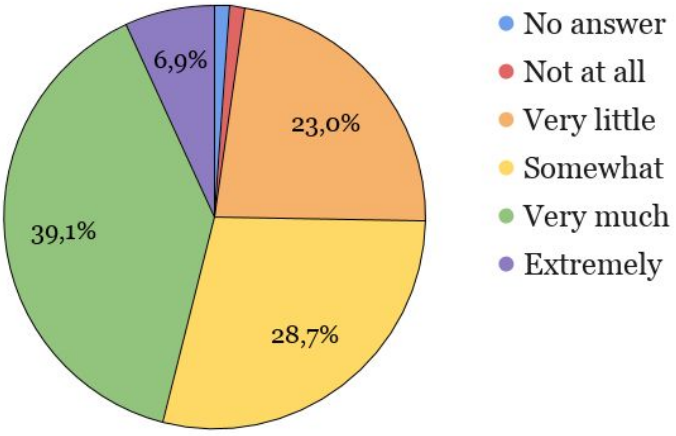

Figure 11: Participants' evaluation regarding the impact of *Duolingo* on their **vocabulary** learning.

With regard to student's evaluation of *Duolingo* to foster their grammar knowledge (Q3: *How much has the app improved your* ***grammar****?*) only 12,6% considered the app between useful and very useful (answering with *extremely* (1,1%) and *very much* (11,5%)), followed by 36,8% who considered the app helped them *somewhat*. Almost half of the participants (48,3%) considered its impact as low or nonexistent (answering with *very little* (34,5%) or *not at all* (13,8%)). And, finally, 2,3% of the participants were not sure about its impact and thus unable to evaluate it (answering with *I do not know*) (Figure 12).

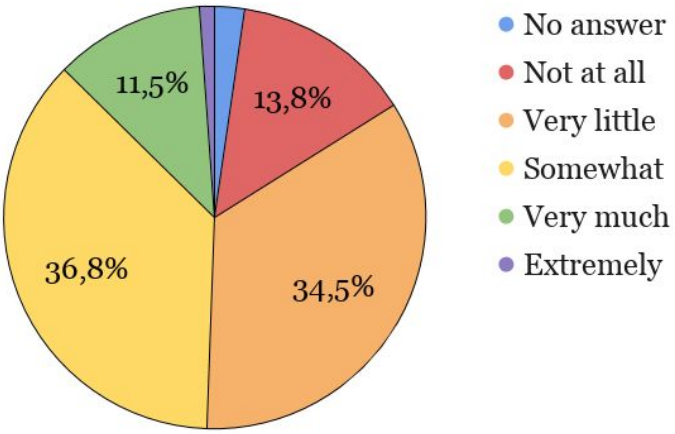

Figure 12: Participants' evaluation regarding the impact of *Duolingo* on their **grammar** learning.

Alongside participants' evaluation of *Duolingo* to improve their reading skills (Q4: *How much has the app improved your **reading**?*) the results show that only 25,3% of the participants considered the app as helpful (answering with *very much* (20,7%) or *extremely* (4,6%)). Following that 35,6 % considered that the app helped them *somewhat* to improve their reading skills. However, a very high number of the learners (39,1%) considered the impact on their reading skills between very low and nonexistent (answering with *very little* (27,6%) or *not at all* (11,5%)) (Figure 13).

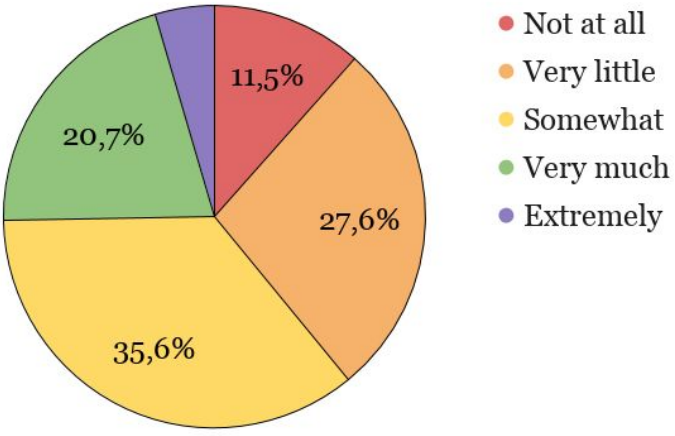

Figure 13: Participants' evaluation regarding the impact of *Duolingo* on their **reading** skills.

With regard to the question where participants had to evaluate the impact of *Duolingo* on their writing skills (Q5: *How much has the app improved your **writing**?*) the results show that only 18,4% considered its impact as beneficial or even very helpful (answering with *very*

much (16,1%) or *extremely* (2,3%)); followed by 35,6% of the participants who claimed that the app helped them to improve their writing skills somewhat. Nevertheless, the high percentage of 45,9% show that almost half of the participants considered its impact as "low" or even "insignificant" (answering with *very little* (31%) or *not at all* (14,9%)) (Figure 14).

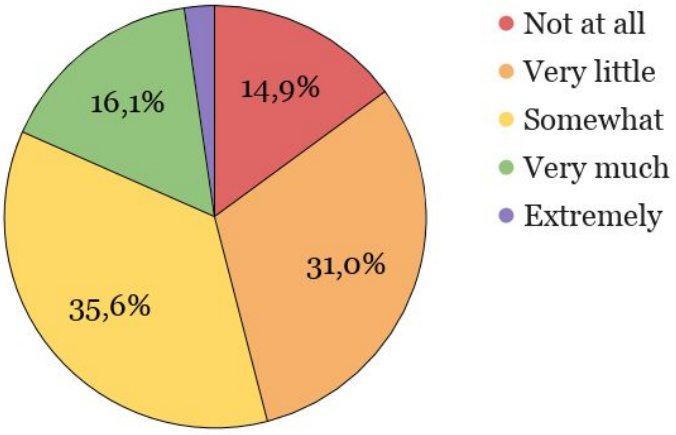

Figure 14: Participants' evaluation regarding the impact of *Duolingo* on their **writing** skill**s**.

The results of the question which evaluated participants' opinion about the app's impact on their listening skills (Q6: *How much has the app improved your* ***listening****?*) show that only 28,7% of the participants considered that the app had a remarkable impact on their knowledge (answering with *very much* (19,5%) and *extremely* (9,2%)), followed by 36,8% who considered the app helped them *somewhat*. Finally, almost the same percentage of the participants (34,4%) considered the app's impact either as very low or even nonexistent (answering with *very little* (24,1%) and *not at all* (10,3%)) (Figure 15).

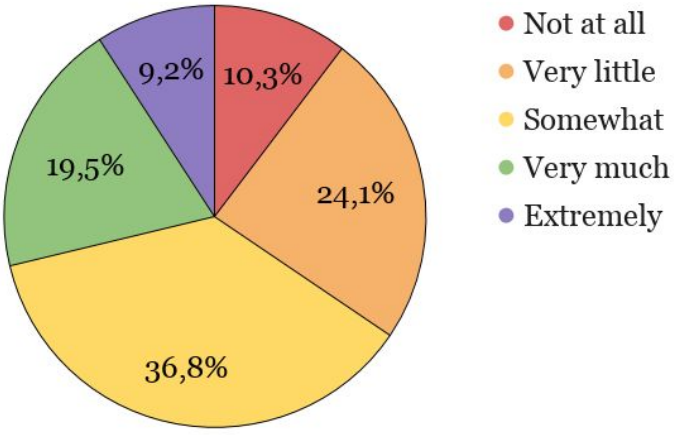

Figure 15: Participants' evaluation regarding the impact of *Duolingo* on their **listening** skill**s**.

The data obtained from the last question in which participants had to evaluate *Duolingo*'s impact on their speaking skills (Q7: *How much has the app* Duolingo *improved your* ***speaking****?*) highlight that no more than 5,8% considered the app as helpful or very helpful (answering *very much* (3,4%) and *extremely* (2,3%)), followed by 27,6% who claimed that its impact was normal and helped them *somewhat* to improve their speaking. However, the high percentage of 65% proves that the majority of students considered that the app had low or even no impact on their speaking skills (by answering *very little* (37,9%) and *not at all* (27,6%)). Once more, there is a 1,1% of participants who could not evaluate it and chose the option *I do not know*. (Figure 16).

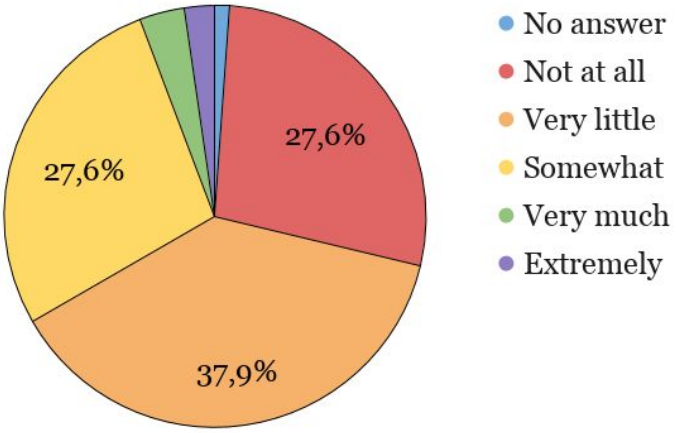

Figure 16: Participants' evaluation regarding the impact of *Duolingo* on their **speaking** skill**s**.

Once the participants had evaluated the app's impact on their language learning, they were asked to evaluate the impact received on their motivation. Of special interest was the correlation between gamification and motivation; that is the use of game elements to increase students' motivation towards learning (Q8: *How would you evaluate, in general, the impact of game elements and its use by "Duolingo" on your motivation?*). Half of the participants (51,7%) reckoned the impact as positive (answering with *good* (46%) and *excellent* (5,7%)), followed by 25,3% who considered the impact of game elements as *normal*. Nevertheless, 17,2% of the participants claimed that the impact was negative for their motivation (answering *not so good* (12,6%) and *bad* (4,6%). Only 5,7% did not know how to evaluate the impact of game elements on their motivation (answering with *I do not know*) (Figure 17).

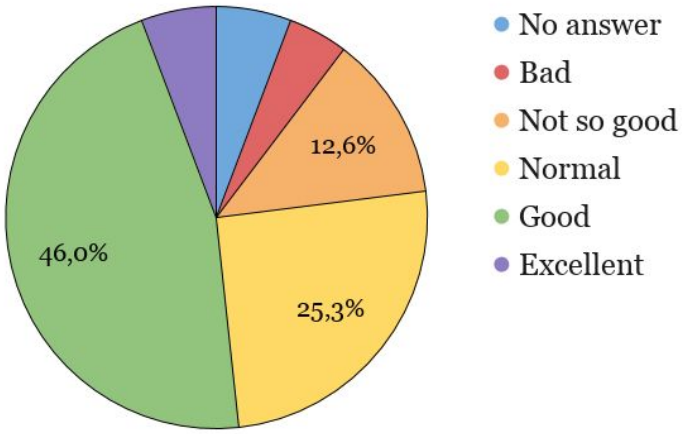

Figure 17: Participants' evaluation about *Duolingo*'s gamified motivational methods.

In addition, participants were asked to evaluate specific game elements by indicating how much these elements affected their motivation to keep using the app and learn a foreign language (Q9: *How much have* ***the following game elements*** *affected your motivation?)*. In this question, we included a list with the most characteristic game elements that are used by the app *Duolingo.* The first one to be evaluated was "**leagues**" which only got 19,5% of participants' approval considering them helpful and very helpful to increase their motivation (answering *very much* (14,9%) and *extremely* (4,6%)), followed by 27,6% who considered that the leagues helped them *somewhat*. Participants who claimed that the benefits given by this game element were very low or even nonexistent got a bit more than half of the votes (50,5%) (answering *very little* (19,5%) and *not at all* (31%)). Finally, there were 2,3% of the participants who considered themselves as unable to evaluate this impact (answering *I do not know*) (Figure 18).

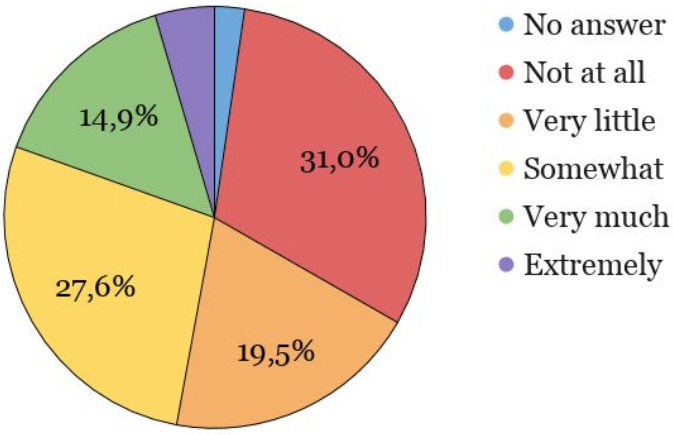

Figure 18: Participants' evaluation of game elements such as "leagues" and its impact on learners' motivation.

Regarding participants' evaluation of game elements such as "**rankings**", merely 17,2% considered its use as very helpful or even helpful for increasing their motivation (answering *very much* (12,6%) and *extremely* (4,6%)), followed by 19,5% who claimed that the rankings helped them *somewhat*. However, the big majority of students (62%), considered that this game element had a low or even nonexistent impact on their motivation (answering *very little* (24,1%) and *not at all* (37,9%)) whereas 1,1% of the students did not know how to classify the impact of this game element on their motivation (Figure 19).

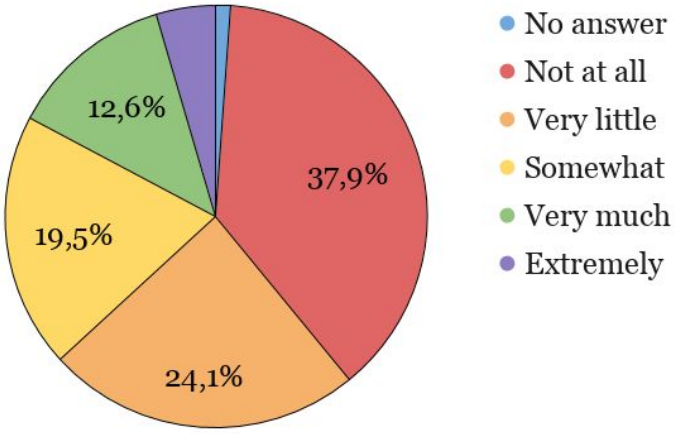

Figure 19: Participants' evaluation of game elements such as "rankings" and its impact on learners' motivation.

The evaluation of game elements such as "**badges**" also got a low approval from the participants. Thus, only 22,9% consider this element as positive for their motivation (by answering *very much* (17,2%) and *extremely* (5,7%)), followed by 25,3% who considered that badges helped them *somewhat* to maintain or increase their motivation. However, amongst all the results, it stands out that more than half of the participants (51,7%) considered that this element had little or no impact on their motivation (answering *very little* (24,1%) and *not at all* (27,6%)) (Figure 20).

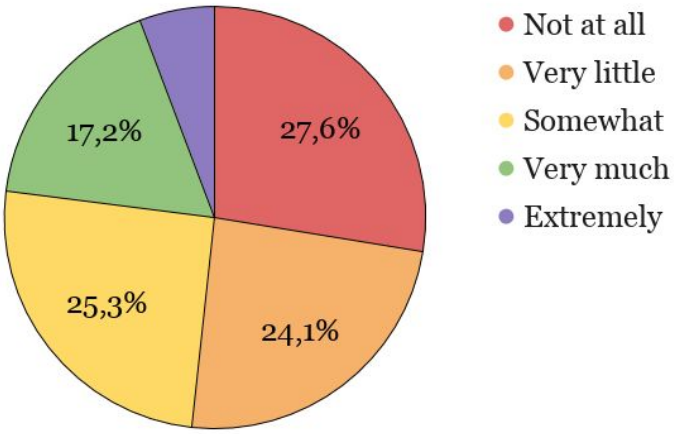

Figure 20: Participants' evaluation of game elements such as "badges" and its impact on learners' motivation.

In order to represent each game element in different ways, *Duolingo* uses different techniques. For instance, "**levels**" are represented in form of badges the user can earn either by "playing" or by completing the respective modules which focuses on a different topic (e.g., family, animals, food, etc.) (Figure 21).

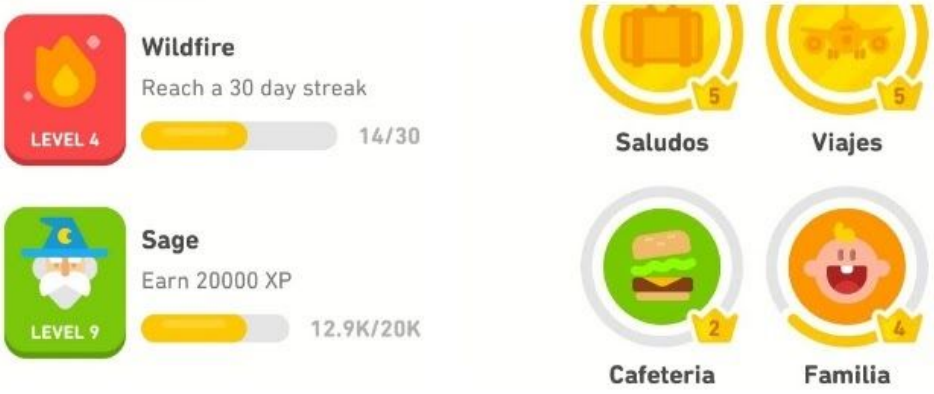

Figure 21: .*Duolingo*'s different representation of "levels".

Therefore, participants were asked to evaluate both different ways of level representations. The results have been joined in one category ("levels") and can be summarized as follows: a considerable number of the participants (46%) claimed that the use of levels was helpful or even very helpful for increasing their motivation (answering *very much* (29,9%) and *extremely* (16,1%)), followed by the also high percentage of 30,5% who considered that the use of levels helped them *somewhat* for their motivation. However, this game element was considered "negative" by 22,4% of the participants who classified levels as "irrelevant" or "weak" for their motivation (answering *very little* (8,6%) and *not at all*

(13,8%)). Once again, no more than 1,1% of the participants could not evaluate the impact of levels on their motivation (answering *I do not know*) (Figure 22).

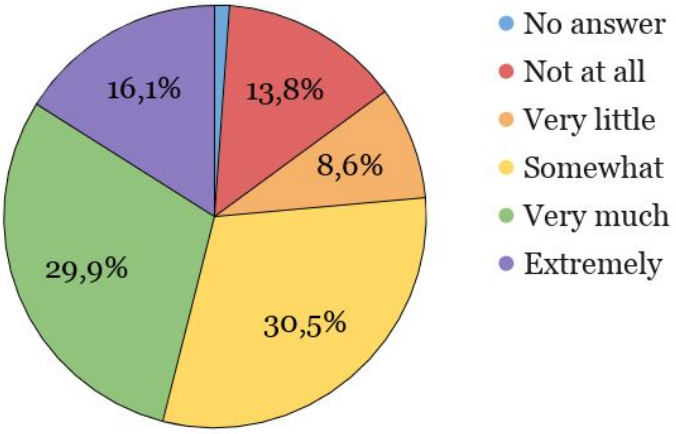

Figure 22: Participants' evaluation of game elements such as "levels" and its impact on learners' motivation.

Concerning the **challenges** posed by *Duolingo,* the most outstanding one is to keep users using the app during days. In fact, there is no reward but only the self-satisfaction of achieving "playing" during a period of time. Thus, participants were asked to evaluate how motivated they felt with the rest of challenges (that appear in the app) and, on the other hand, with this specific challenge known as "playing in a row". The results were joined in the category "challenges" and show that a not so high number of participants (35,6%) find this game element very helpful or helpful for their motivation (answering *very much* (18,4%) and *extremely* (17,2%)). Fewer participants (21,8%) considered that the challenges helped them *somewhat* to keep being motivated whereas the majority of the app's users participating in the survey (39%) considered that this game element had very little or even no impact at all on their motivation (answering *very little* (19,5%) and *not at all* (19,5%)). To conclude, there are 3,4% of the participants who did not know how to evaluate the impact of this game element on their motivation (Figure 23).

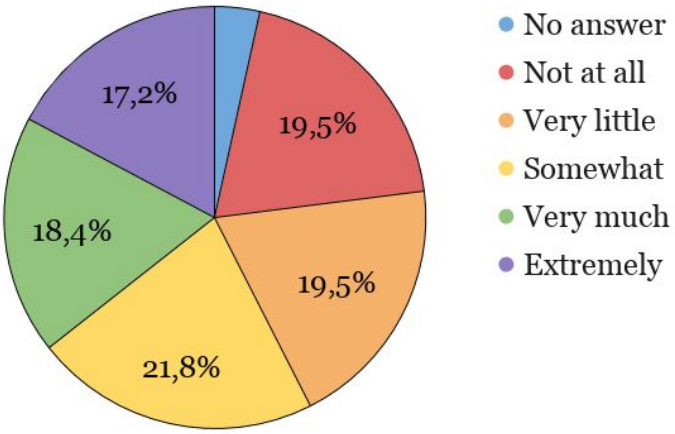

Figure 23: Participants' evaluation of game elements such as "challenges" and its impact on learners' motivation.

With regard to the question where participants had to evaluate the use of "**points**", it is needed to be said that this game element is represented in different ways within the app: first, as "experience points" that the user gets each time a lesson is accomplished, as "crowns" whose numbers represent how much the user has been participating in the app's activities, "lingots" that let the user trade it for some benefits, etc. The results from the survey highlight that only 32,2% of the participants considered that this game element affected their motivation in a positive way (answering *extremely* (6,9%) or *very much* (25,3%)), followed by those who considered that it helped *somewhat* to keep them motivated (29,9%). However, it is remarkable that almost 40% of the participants did not appreciate the use of points considering that they did not help them very much or even nothing to keep them motivated (answering *very little* (20,7%) and *not at all* (17,2%)) (Figure 24).

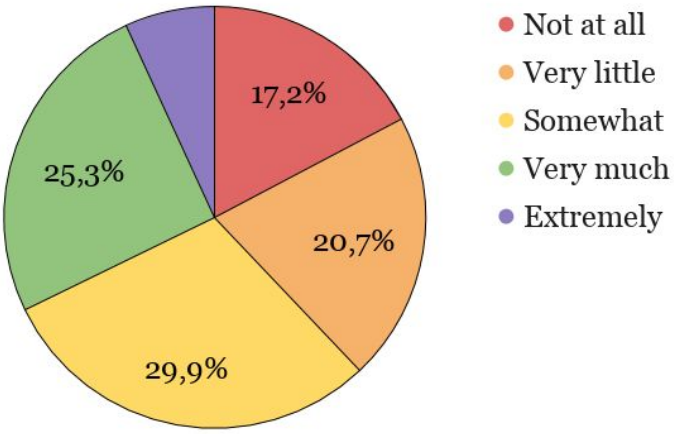

Figure 24: Participants' evaluation of game elements such as "points" and its impact on learners' motivation.

Regarding the question that evaluated the use of game elements such as "**avatars**", the results show that they were classified as helpful by no more than 8% of the participants (answering *very much* (5,7%) and *extremely* (2,3%)), followed by a not so much higher percentage (18,4%) who considered that the use of avatars helped them *somewhat* to increase their motivation. Then, those who denied the impact and considered it low or even nonexistent, got an overwhelming 70,1% in total (answering *very little* (32,2%) and *not at all* (37,9%)). And, finally, 3,4% did not know how to evaluate this game element (answering *I do not know*) (Figure 25).

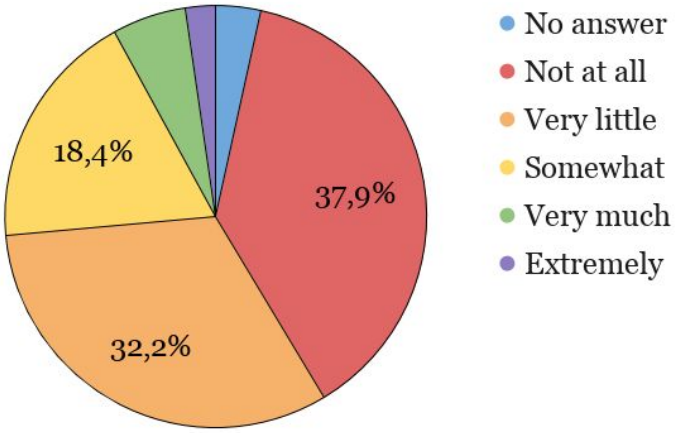

Figure 25: Participants' evaluation of game elements such as "avatars" and its impact on learners' motivation.

Participants were also asked to evaluate how helpful they considered "**performance graphs**" to increase their motivation. Once more, the positive evaluation got a low percentage (12,6%) of participants considering this game element as helpful or very helpful (answering *very much* (11,5%) and *extremely* (1,1%)). Those who considered that performance graphs' helped *somewhat* to keep them motivated got 32,2% of the votes. However, more than half of the participants (52,9%) disliked this element and considered that the impact helped not so much or not at all (answering *very little* (25,3%) and *not at all* (27,6%)). Finally, there were 2,3% of the participants who considered themselves as unable to evaluate their impact (answering *I do not know*) (Figure 26).

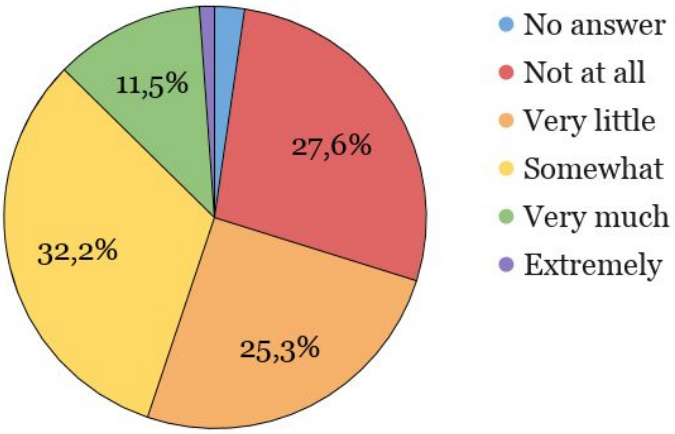

Figure 26: Participants' evaluation of game elements such as "performance graphs" and its impact on learners' motivation.

The evaluation of game elements such as "**competition**" got a low number of participants who considered the impact of this game element as positive (22,9%) (answering *very much* (12,6%) and *extremely* (10,3%)). Followed by those who considered that it helped them *somewhat* to keep them motivated towards using the app (16,1%). Once more, the highest percentage (59,7%) were for those who considered the impact of this game element as "low" or "nonexistent" (answering *very little* (17,2%) and *not at all* (42,5%)). Only 2,3% of the participants considered themselves as not capable of evaluating the impact (answering *I do not know*) (Figure 27).

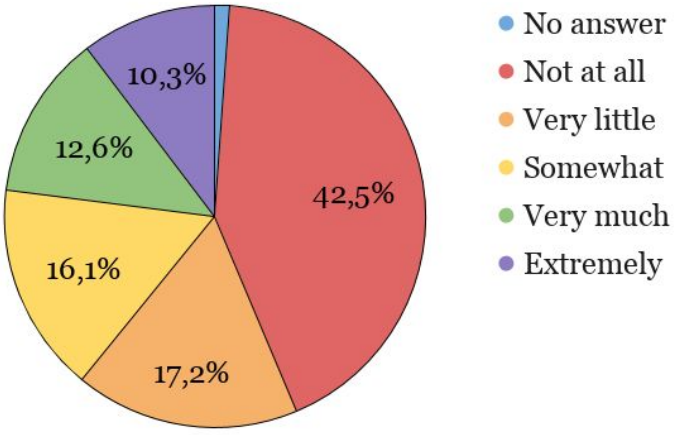

Figure 27: Participants' evaluation of game elements such as "competition" and its impact on learners' motivation.

Participants were asked to evaluate the element "**rewards**" which results show that only 24,1% of participants claimed that it was helpful or very helpful for their motivation (answering with *very much* (12,6%) and *extremely* (11,5%)). Then, no more than 21,8% considered it helped them *somewhat* to maintain their motivation. However, the high percentage of 52,8% represented those who rejected it by considering its impact as "low" or even "nonexistent" (answering *very little* (19,5%) and *not at all* (33,3%)). Only 1,1% was not sure about how to classify the impact received by this game element (answering with *I do not know*) (Figure 28).

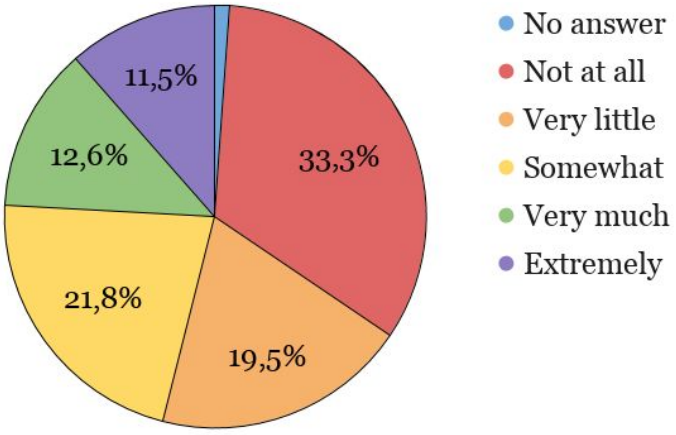

Figure 28: Participants' evaluation of game elements such as "rewards" and its impact on learners' motivation.

With regard to the evaluation of game elements such as "**storytelling**", its use was classified by only 18,3% of the participants as helpful, or very helpful, to increase their motivation (answering with *very much* (14,9%) and *extremely* (3,4%)). Those who considered this game element helped them *somewhat* got a bit higher percentage (23%). Nevertheless, more than the half of the participants (54%) had a negative opinion about the storytellings and classified the impact received as "weak" or even "nonexistent" for their motivation (answering with *very little* (21,8%) and *not at all* (32,2%)). Then, 4,6% of participants were not sure about the impact of the storytelling element on their motivation and gave no answer in the survey (answering with *I do not know*) (Figure 29).

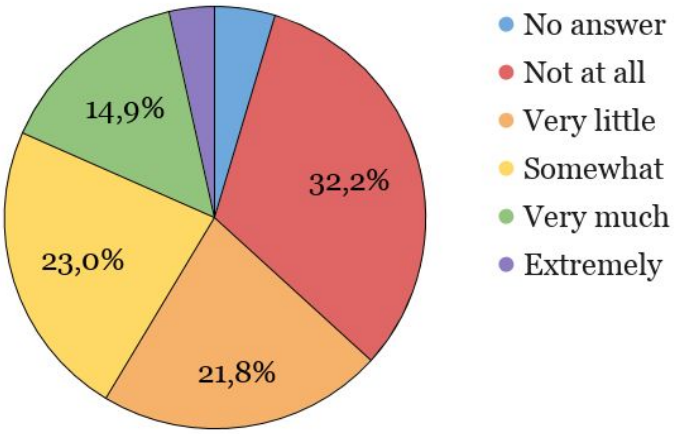

Figure 29: Participants' evaluation of game elements such as "storytelling" and its impact on learners' motivation.

In the last question related to game elements, participants were asked to evaluate the "**feedback**" given by the app represented as the pet called Duo. Once more, the results show that only 11,4% were pleased and considered it helpful or very helpful for their motivation (answering with *very much* (8%) and *extremely* (3,4%)). Not such a high percentage of participants (19,5%) considered that this game element affected their motivation *somewhat*. Then again, a considerable high 64,4% claimed that the effect of constant feedback received was very low or even nonexistent for their motivation and did not help them so much to keep using the app (by answering *very little* (34,5%) and *not at all* (29,9%)). To conclude, 4,6% of the participants did not know what to answer about how much this game element helped them keeping them motivated in using the app (Figure 30).

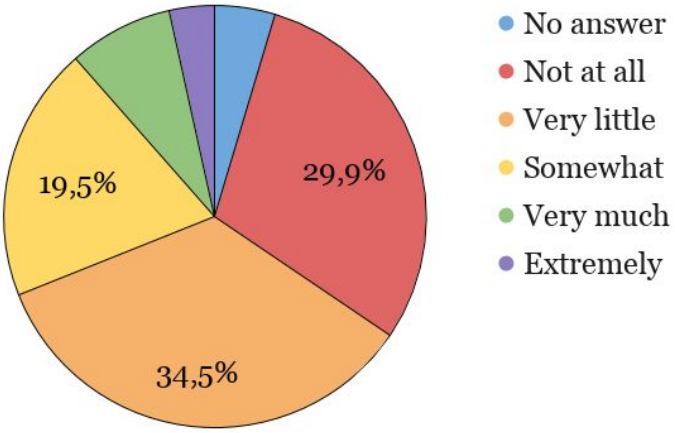

Figure 30: Participants' evaluation of game elements such as "feedback" and its impact on learners' motivation.

V. RESULTS AND DISCUSSION

With a view to provide responses to the RQs posed, in this section we will analyse the data collected from the survey given to 87 *Duolingo* users.

In order to answer RQ1 (*What kinds of language learning skills are enhanced by using the app* "*Duolingo*"*?*) the users were asked to evaluate the impact of *Duolingo* on their different language skills (i.e., vocabulary, grammar, reading, writing and speaking). According to 46% of the participants, the only skill that obtained a positive evaluation was "vocabulary". 35,6% of the participants claimed that the app somewhat affected their listening skills., However, the remaining skills got a remarkable negative evaluation; "grammar" (48,3%), "reading" (39,1%), "writing" (45,9%) and "speaking" (65%).

Alongside participants' evaluation of *Duolingo* to improve their language skills, they were also asked to evaluate the impact received on their motivation by using different game elements (RQ2: *What kinds of game elements help to increase learners' motivation towards language learning?*). The users evaluated 12 different game elements in total and only one of them had a positive evaluation. This specific game element was "levels" which enhanced the motivation of 46,1% of the participants. Despite this, the remaining game elements were considered to have no impact, or if it were to have some impact, this was barely noticeable for the majority of participants. The following list shows the percentage of participants considering this impact "poor" or even "nonexistent" for their motivation :

- Leagues: 50,5%
- Rankings: 62%
- Badges: 51,5%
- Challenges: 39%
- Points: 37,9%
- Avatars: 70,1%
- Performance graphs: 52,9%
- Competition: 59,7%
- Rewards: 52,8%
- Storytelling: 54%
- Feedback: 64,4%

To answer RQ3 (*What do "Duolingo" users think about the app and its impact on their language learning and motivation?*), we collected data from two different questions included in the survey. The results from the first question (*How much has the app improved your general language knowledge?*) show that more than half of the participants (51,7%) claimed that *Duolingo* slightly helped them to improve their general knowledge in the target language. In fact, only 19,5% evaluated the impact of the app as positive for their language learning, while 36,7% of the participants considered that the app did not or barely helped them to improve their language skills. The second question (*How would you evaluate, in general, the impact of game elements and its use by "Duolingo" on your motivation?*) shows that, surprisingly, half of the participants (51,7%) considered the use of game elements, in general, as very positive to increase their motivation, followed by 25,3% who considered that its use helped them only somewhat, followed by 17,2% who considered its impact as "poor".

VI. CONCLUSIONS

As pointed out by Berns et al. (2015) students who learn a foreign language only in a traditional classroom setting, without any additional exposure to the target language beyond class, often lack the language practice they need to acquire the different language skills they are expected to have by the end of the course. For this reason, Kennedy and Levy (2009) have stressed the importance of providing students with the use of self-directed learning strategies. In addition, Lee and Hammer (2011) emphasised the importance of enhancing students' motivation. In this context, several researchers (Figueroa-Flores, 2015; García, 2013; Yanes & Bououd, 2019; etc.) have pointed out that aspects such as language learning could be improved by the use of game elements. Yanes and Bououd (2019) state that many teachers have started using gamification in order to instruct students in different kinds of disciplines and as Figueroa-Flores (2015) confirms, there is a strong possibility that students become more motivated in learning a foreign language when the lessons are gamified. A very popular language learning app in this context is *Duolingo* which combines translation exercises with game elements and which has proven to be successful to enhance foreign language learning (García, 2013).

Hence, the focus of the current work was to analyse the potential of *Duolingo* to increase students' learning and motivation. In order to accomplish this investigation, 87 users of the app were asked to fill in a survey which was meant to evaluate the app's impact on learners' learning and motivation. Surprisingly, the results taken from the survey show that the majority of the participants, generally have a negative perspective about the app's impact on their foreign language learning as well as on their motivation. In view of the learning part, the participants were asked to evaluate different skills individually, such as vocabulary and grammar knowledge, listening, writing, reading and speaking. In general, participants claimed that the app did not affect their language skills at all. However, the impact received on their vocabulary knowledge was quite positive and that supports García-Botero's (2019) theory which maintains that the *Duolingo* method is mainly focused on the acquisition of vocabulary. According to the survey's results in terms of learner motivation, once again the participants' feedback was mostly negative. Amongst 12 different game elements that were evaluated, only one of them ("levels") got a positive evaluation.

According to the surveys' participants, the app *Duolingo* only has a positive impact on the users' vocabulary while their motivation was only enhanced by one of the 7 game elements (levels) analysed. Due to Ali et al. (2012), getting vocabulary input is necessary, particularly when someone starts learning a language. However, in order to develop other skills than just vocabulary learners need also to interact in the target language (Berns et al. 2015), hence being the reason why *Duolingo*'s results were not as successful as initially expected. Having taken into account the above mentioned reflections, we could declare that the reason why the majority of users are still unmotivated while using *Duolingo* is, maybe, because of its use of the outdated grammar translation method (GMT).

As some authors confirm (Yanes & Bououd, 2019), researchers have different opinions about the efficiency of combining game elements in language learning lessons: some claim that they lead into an effective learning while others believe that games -and everything related to it- are superficial activities which should be part of the learning process. So, as Figueroa-Flores (2015) concludes, there is still a lot of research that needs to be done in order to identify with regard to the potential of gamification and language learning.

VII. REFERENCES

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